Seeding Rates for Precision Seeded Canola

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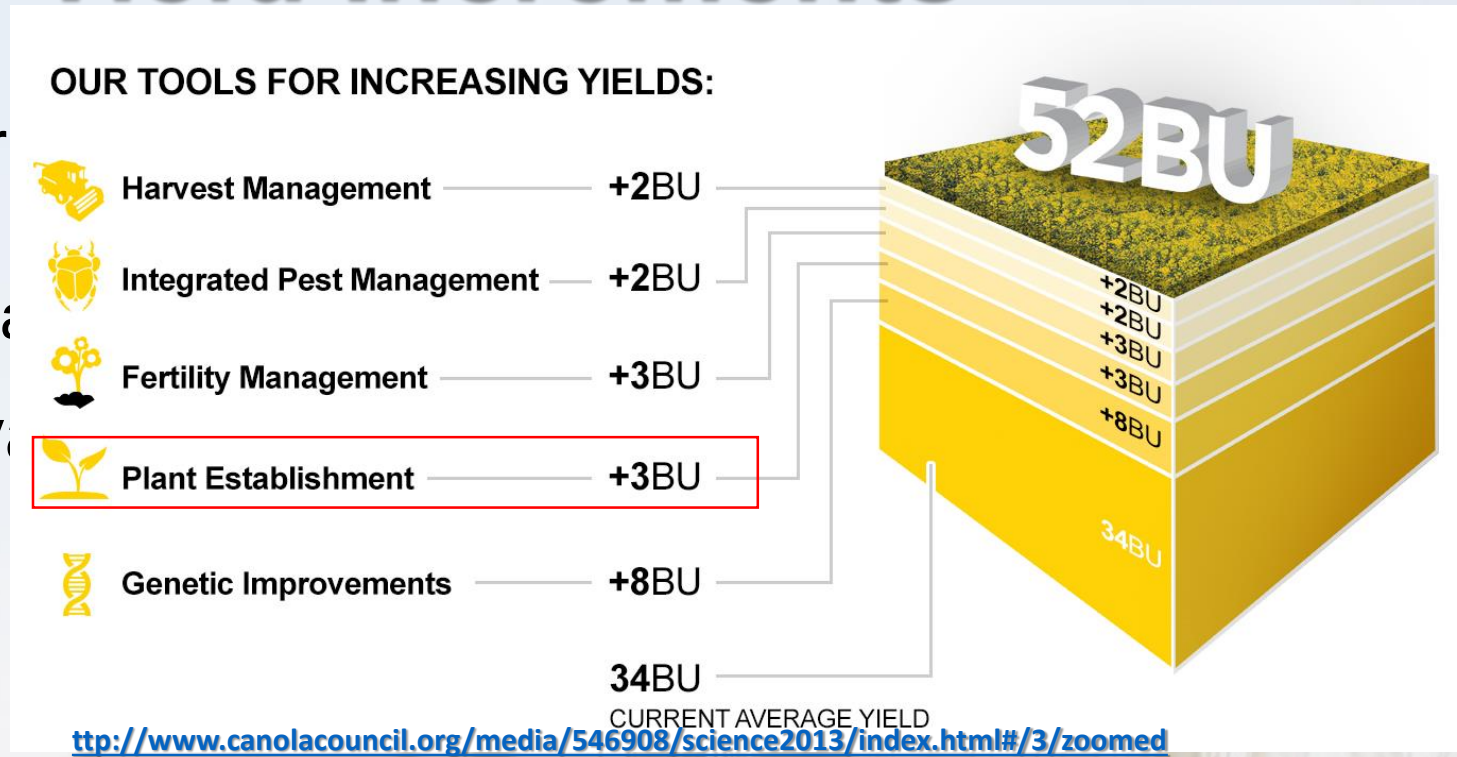
Sources of Yield Increments

- Since the 1950's yield incr
  - improved cultivars (50 %)
  - Improved fertility, pest mana
- Breeding continues to adv
- How much more progress
  management
- *Is there potential for precision seeding?*
  - Even crop emergence across field
  - Reduced seed cost
  - Higher yield (Economic benefit)



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Precision Seeded Corn

- Began with introduction of high yielding hybrids
  - Seed costs were high
  - Crop was very responsive to management
- Plant density
- Row spacing
- Early vs late emerging plants
- Overall precision seeded corn increased yield by 15-20 %
- *But corn isn't canola*
  - Seed size (Difficult to "singulate" seed)
  - Emergence % is variable
  - Self-thinning
  - Capacity to compensate for lower populations

Relationship between Plant Density & Yield

- Yields are generally maximized at plant populations above 50 plants m^{-2}
- Canola can compensate at low plant populations by increasing branching to maintain yield over a range of plant densities
- Plants uniformity is vital when plant density decreased

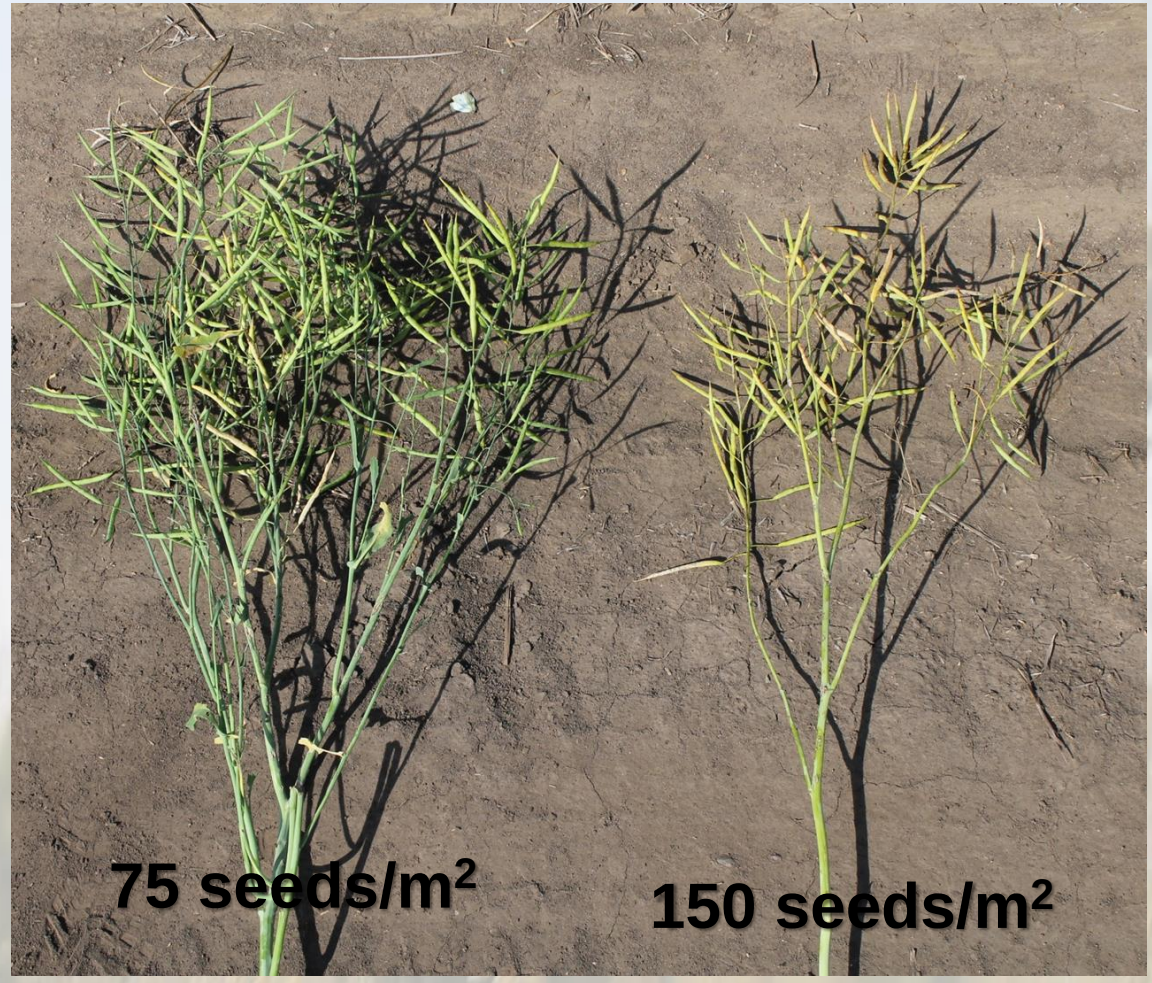
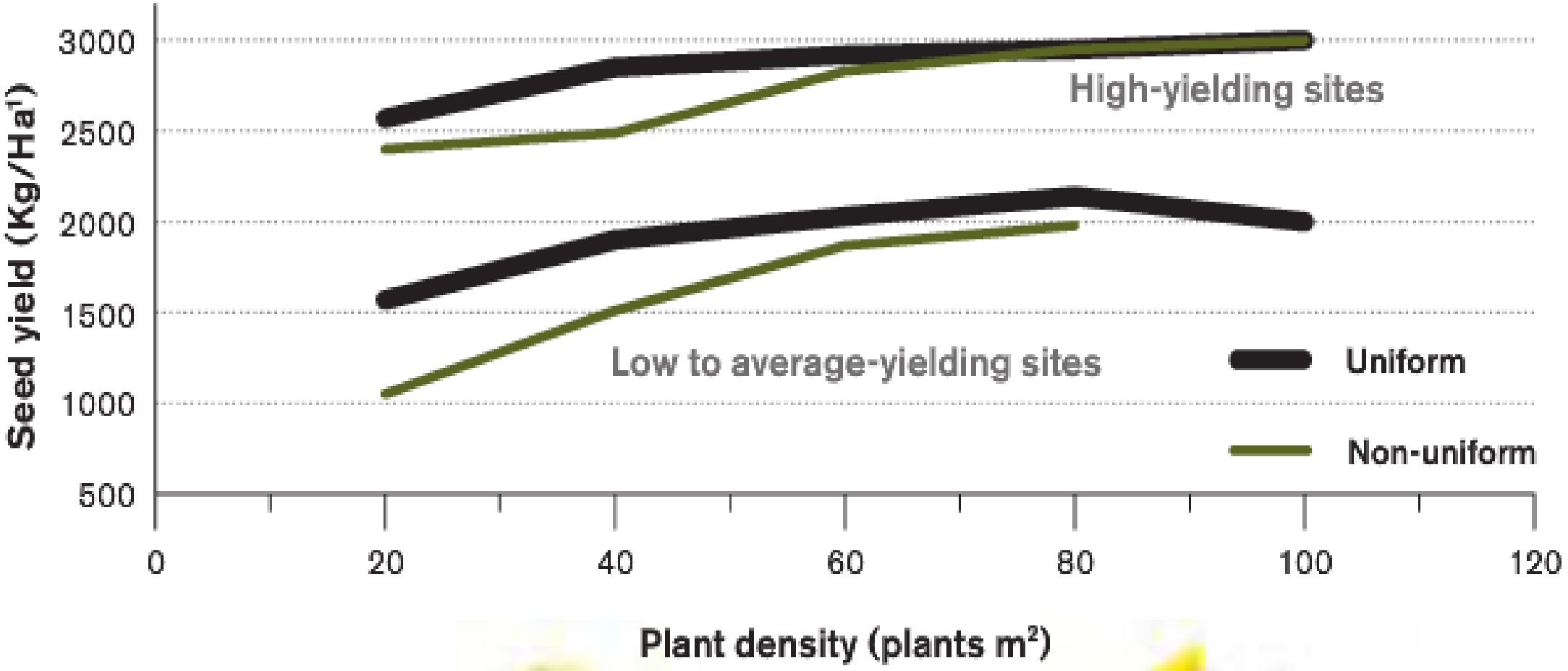


Figure 1. Uniform stands yield more, especially at lower plant densities.



Canola Council of Canada. 2013. Canola Digest Science Edition. [Online]. Available: ttp://www.canolacouncil.org/media/546908/science2013/index.html#/3/zoomed

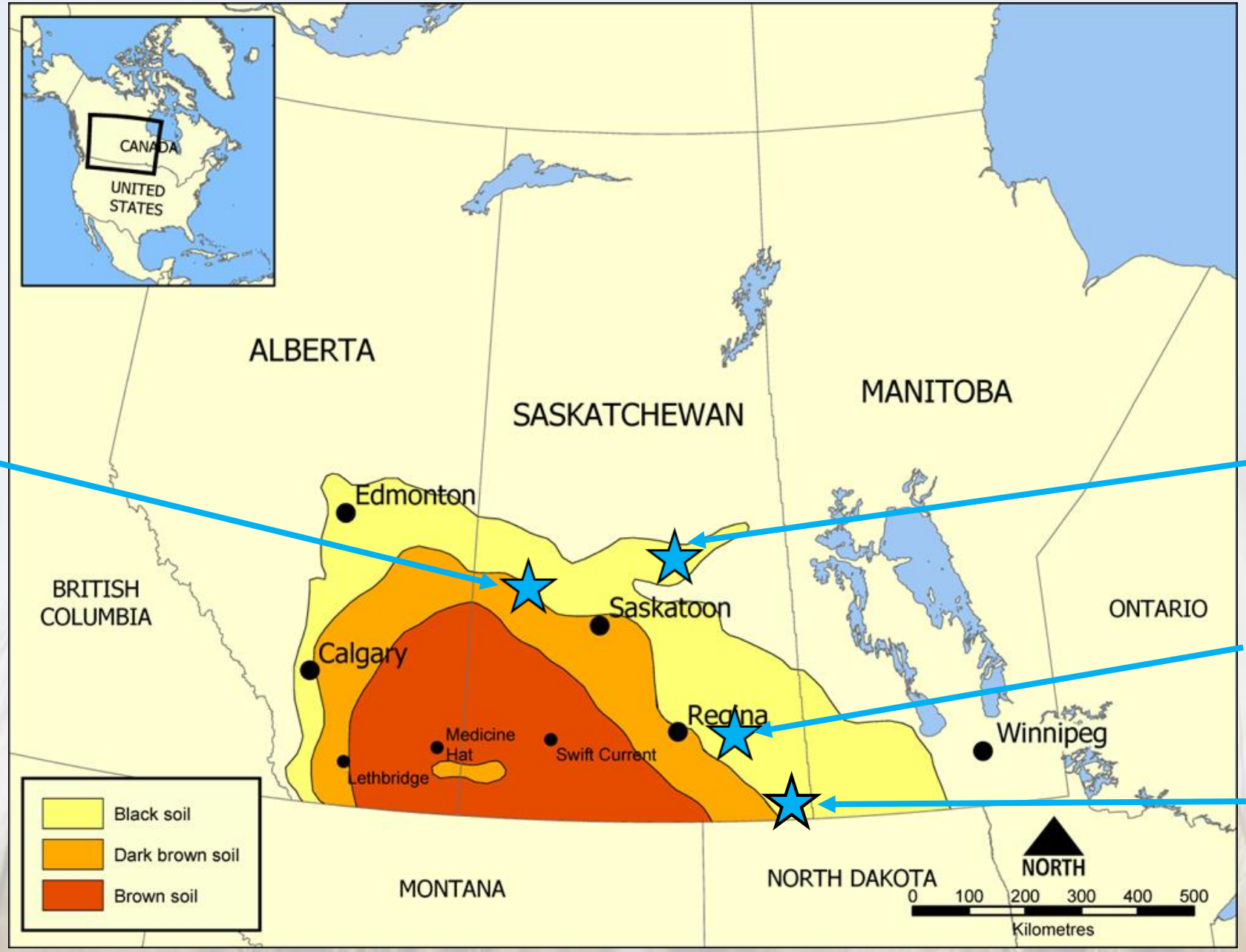
Seed Metering Systems for Air-Carts

UltraPro Roller

Valmar Roller

Study Objectives

- Assess seedling uniformity of the UltraPro Roller compared to a traditional Valmar Roller
- Determine if differences in uniformity affect minimum plant population required to reach maximum yield potential of canola



Scott, SK
(**Dark Brown** Soil Zone)

Melfort, SK
(**Black** Soil Zone)

Indian Head, SK
(**Black** Soil Zone)

Redvers, SK
(**Black** Soil Zone)

"http://commons.wikimedia.org/wiki/File:Palliser%27s_Triangle_map.png#mediaviewer/File:Palliser%27s_Triangle_map.png


Target 10 seeds m-2


Target 20 seeds m-2

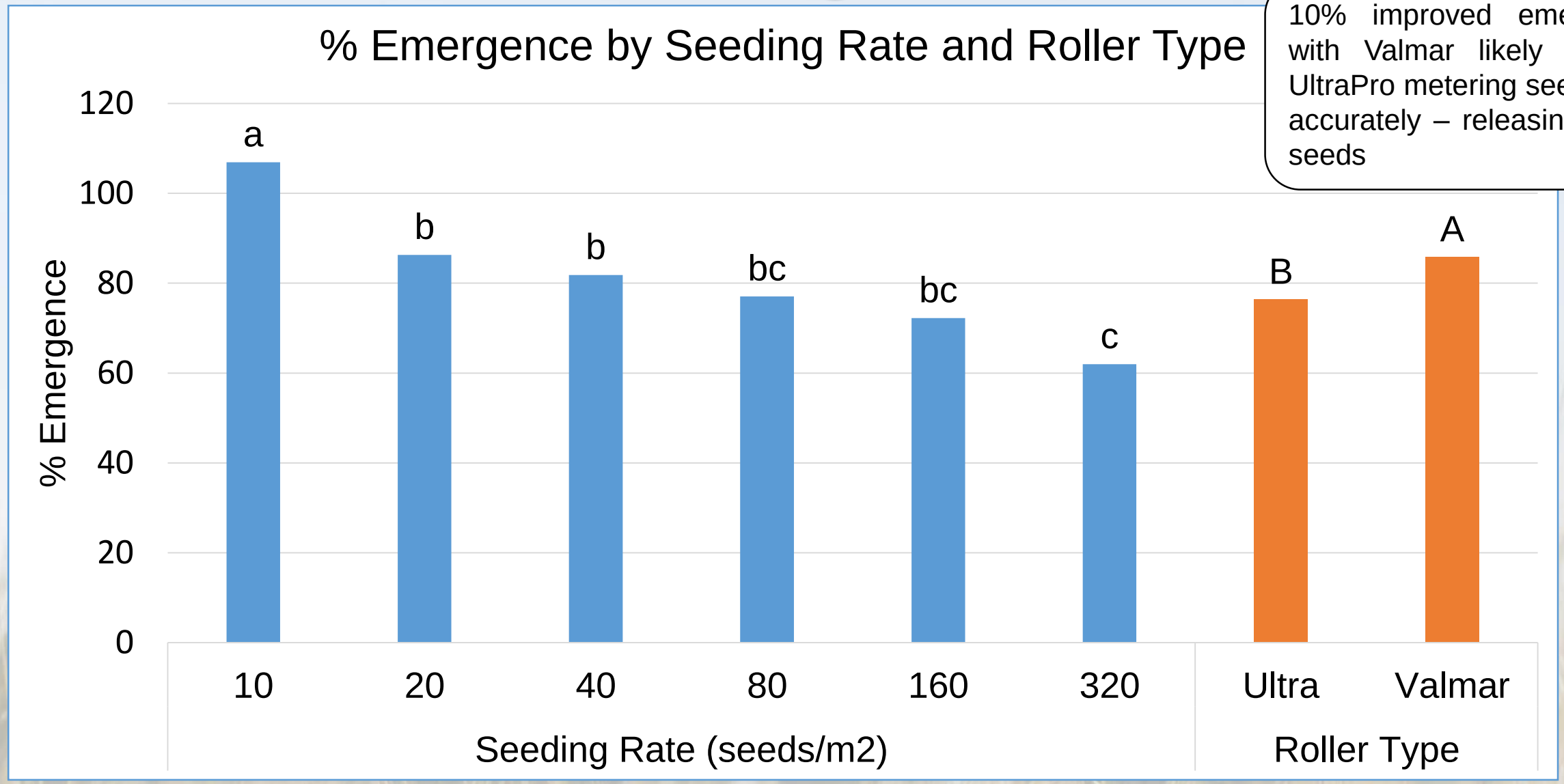

Target 40 seeds m-2


Target 80 seeds m-2


Target 160 seeds m-2


Target 320 seeds m-2
10
1

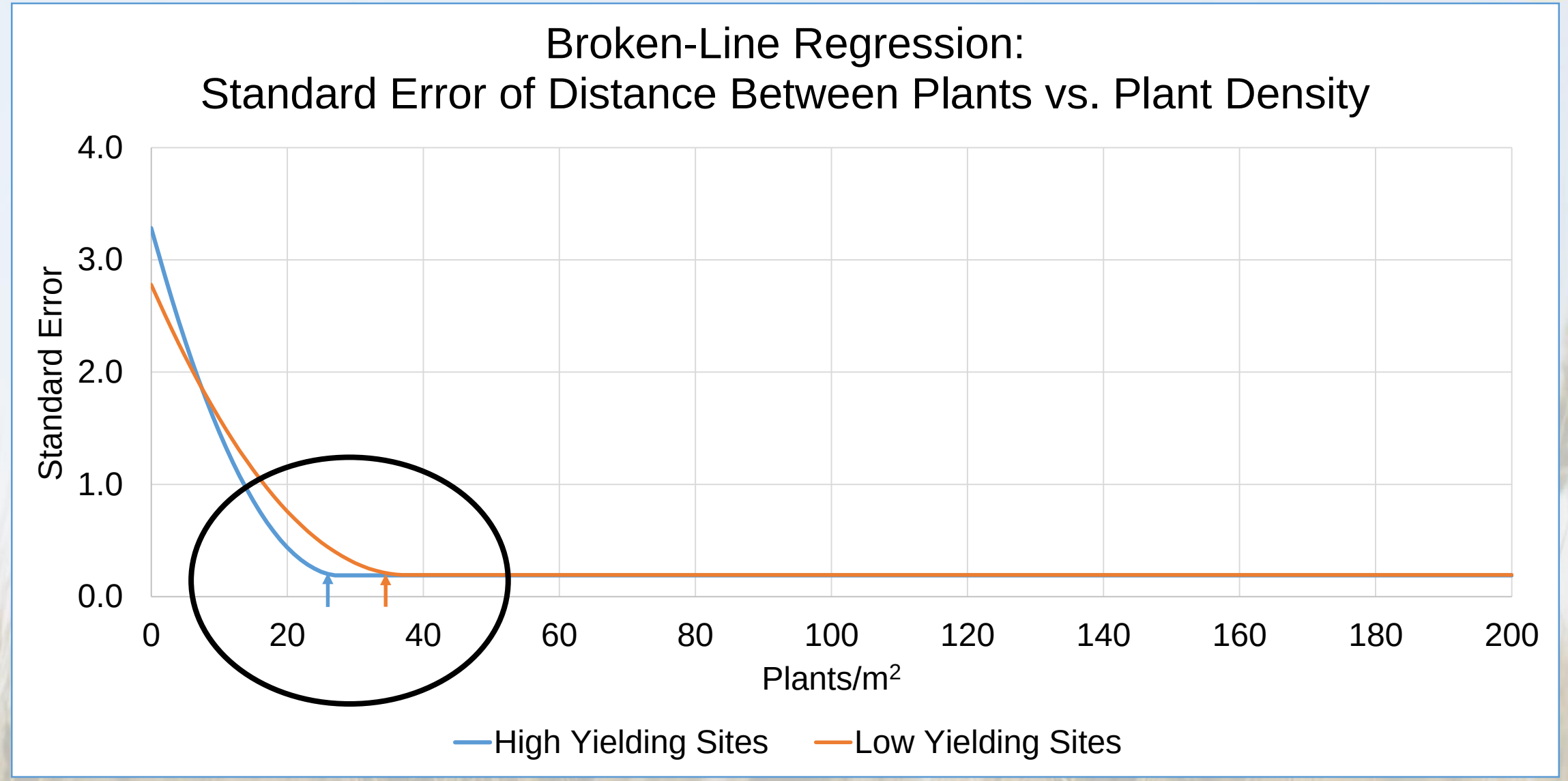
% Emergence



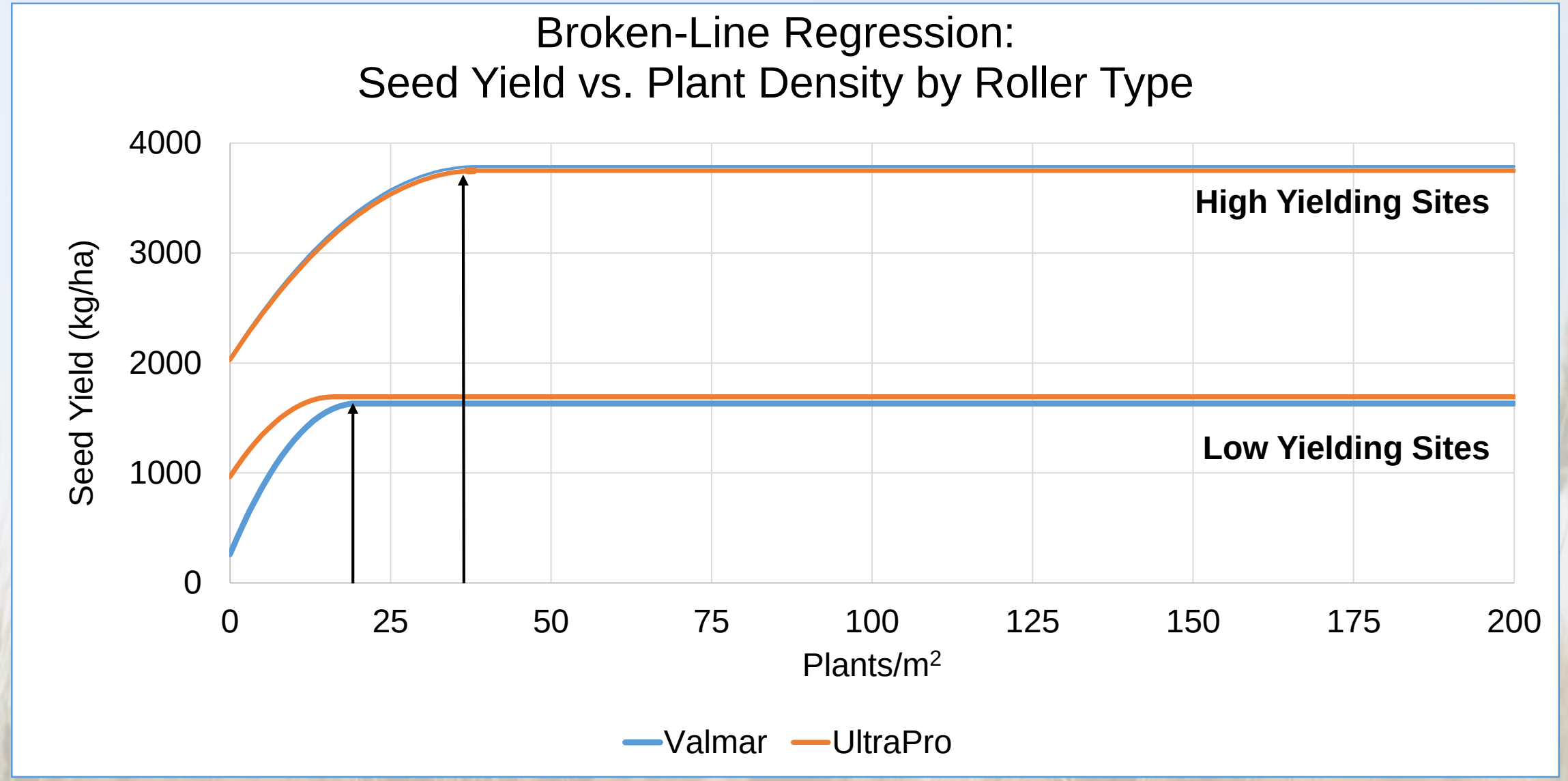
10% improved emergence with Valmar likely due to UltraPro metering seed more accurately – releasing fewer seeds

Seeding Rate Effect: ** Roller Type Effect: * Seeding Rate x Roller Type Interaction: NS

Uniformity


Broken-Line Regression:
Standard Error of Distance Between Plants vs. Plant Density
Standard Error
4.0
3.0
2.0
1.0
0.0
0
20
40
60
80
100
120
140
160
180
200
Plants/m2
High Yielding Sites
Low Yielding Sites

Yield vs. Plant density

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Target 160 seeds m-2


Target 320 seeds m-2

Preliminary Conclusions

- Lowest seeding rate was likely not metered out accurately
  - It appears the UltraPro accurately metered out seed than the Valmar
- Increasing plant population rapidly decreased variability in distance between seedlings
  - Plant uniformity was affected by plant density, not roller type
- Plant uniformity does not appear to be as important as plant density/other factors in determining canola yield potential
  - High yielding sites – needed 38 plants m^{-2} to reach maximum yield, but uniformity was maximized at 27 plants m^{-2}
  - Low-yielding sites – needed only 17 plants m^{-2} to reach maximum yield, but uniformity was maximized at 38 plants m^{-2}

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